
Remarks

Claims 1-38 were originally filed and are pending. Independent Claims 1 and 38 are being herein amended to further clarify the substantially inorganic nature of the photoreactive composition by specifying (a) that the composition comprises at least one reactive species that is organic or hybrid organic/inorganic and (b) that, when the reactive species is organic, the composition further comprises either a plurality of inorganic particles or a hybrid organic/inorganic reactive species (or both). Basis for these amendments can be found, for example, in Claim 4 and at page 4, lines 21-23; page 6, lines 9-10; and page 10, lines 18-19, of Applicants' specification. Claim 7 is being canceled in view of its redundancy, and Claim 4 is being amended to eliminate redundancies resulting from the amendment of Claim 1.

Rejection Under 35 U.S.C. Section 102

Claims 1-27 and 36-38 were rejected under Section 102(e) as being anticipated by U.S. Patent Application Publication No. 2004/ 0012872 (Fleming et al., hereinafter referred to as Fleming). This rejection is respectfully traversed for the following reasons.

Fleming describes methods for producing a region of at least partially reacted material in a photoreactive composition. In one embodiment, such a method involves the use of an exposure system that includes three or more light beams to generate a non-random three-dimensional pattern of light using optical interference from the three or more light beams. The method further includes exposing a photoreactive composition to the three-dimensional pattern to at least partially react a portion of the material in correspondence with the non-random three-dimensional pattern of light incident thereon. (See Paragraph [0022].) The Examiner has asserted that such method anticipates Applicants' claimed process.

Applicants' process differs from Fleming, however, in at least one significant way: whereas Fleming describes conventional organic photoreactive compositions (see Paragraphs [0073]-[0096] and Example 8, which utilizes only organic materials and includes no removal step), Applicants utilize a substantially inorganic photoreactive composition (see, for example, Claim 1). A "substantially inorganic photoreactive composition" is defined at page 4 of Applicants' specification as being a photoreactive composition that, upon photoreaction and

pyrolysis, loses less than about 80 percent of its initial weight. Applicants previously amended independent Claims 1 and 38 to expressly recite this definition.

In response, the Examiner has cited portions of Fleming that describe photoinitiator system components such as electron donor compounds and photoinitiators. Although Fleming's reactive species are organic, the Examiner has asserted that the presence of the photoinitiator system components renders Fleming's compositions substantially inorganic.

Applicants disagree with the Examiner's assessment. Many of such components appear to have at least some organic content (for example, alkyl or aryl moieties), and, even when essentially inorganic, the components are present in Fleming's photoreactive composition only in small amounts (see Paragraph [0180], which states that the composition preferably contains these components in amounts of about 0.1 to about 5 or 10 weight percent), which is typical for photoinitiator systems.

Thus, the compositions of Fleming are not substantially inorganic but rather substantially organic. Such compositions, upon photoreaction and pyrolysis, would lose almost all their initial weight (80 percent or greater), due to decomposition of the organic components (which constitute most of the composition). (Pyrolysis is transformation of a compound into one or more other substances by heating, and thus pyrolysis goes beyond the mere removal of volatile compounds that was referenced by the Examiner.)

In order to advance prosecution, however, Applicants have further amended independent Claims 1 and 38 to further clarify the inorganic nature of the substantially inorganic composition used in Applicants' process. Applicants have amended these claims to specify (a) that the substantially inorganic composition comprises at least one reactive species that is organic or hybrid organic/inorganic and (b) that, when the reactive species is organic, the composition further comprises either a plurality of inorganic particles or a hybrid organic/inorganic reactive species (or both). (Suitable reactive species and inorganic particles are described, for example, at pages 4-11 and 35-39 of Applicants' specification. Useful hybrid organic/inorganic reactive species include silane compounds that have at least one polymerizable organic group.) Since Fleming neither teaches nor suggests the use of the substantially inorganic compositions specified by Applicants' further amended claims, Applicants respectfully submit that their claimed process is indeed patentable over Fleming and respectfully request that the rejection under Section 102 be withdrawn.

Rejection Under 35 U.S.C. Section 103

Claims 28-35 were rejected under Section 103(a) as being unpatentable over U.S. Patent Application Publication No. 2004/ 0012872 (Fleming et al., hereinafter referred to as Fleming) in view of U.S. Patent Application Publication No. 2004/ 0198582 (Borrelli et al., hereinafter referred to as Borrelli). This rejection is respectfully traversed for the following reasons.

Borrelli describes optical elements and a method of making optical elements. The method includes the steps of providing a silver halide-containing glass material; exposing the glass material to patterned ultraviolet radiation having a peak wavelength of less than about 300 nm or to pulsed patterned radiation having a peak wavelength of between 600 nm and 1000 nm, thereby forming exposed regions and unexposed regions; and subjecting the exposed glass material to a heat treatment to form the optical element, wherein exposed regions of the glass material have a substantially different refractive index than unexposed regions of the glass material after being subjected to the heat treatment. (See Paragraphs [0009] and [0010].)

The Examiner has stated that Fleming discloses the removal of reacted or unreacted portions of photoreactive composition following exposure, but that Fleming does not disclose the deposition of a semiconductor material in any resulting voids. The Examiner has further asserted that Borrelli corrects this deficiency of Fleming by describing the filling of gratings with silica. This is incorrect, as both Fleming and Borrelli fail to describe the deposition of a semiconductor.

Rather than describing a deposition step, Paragraph [0040] of Borrelli (referenced by the Examiner) discloses the covering of irradiated samples with a high purity fused silica block, followed by heat treatment in a furnace at 550°C for 2 hours. This procedure is explained in Paragraph [0027] of Borrelli, which includes the following sentence: “During the heat treatment, it may be desirable to cover the surface of the glass, for example, with a block of high purity fused silica, in order to protect the surface from discoloration in the furnace.”

Thus, as Applicants previously explained, the step referenced by the Examiner is for protection purposes and is not a deposition of any sort. Furthermore, even if it were possible to deposit silica at such temperatures (which is not the case, as the melting and boiling temperatures of silica (1710°C and 2230°C, respectively) are significantly higher than 550°C), the material

being “deposited” is not a semiconductor. Silica is silicon dioxide, which is not a semiconductor. Silicon is a semiconductor.

The combination of Fleming and Borelli fails to provide Applicants’ claimed invention by failing to teach or suggest at least the use of Applicants’ substantially inorganic photoreactive composition, the use of a deposition step, and the use of a semiconductor material. Applicants therefore respectfully submit that their claimed process is indeed patentable over this combination of references and respectfully request withdrawal of the rejection under Section 103.

Double Patenting Rejection Under 35 U.S.C. Section 101

Claims 1-38 were provisionally rejected under Section 101 as claiming the same invention as that of Claims 1-35 of copending U.S. Patent Application No. 10/596,186 (Anderson et al.). This rejection is respectfully traversed for the following reasons.

The Examiner has asserted that the claims of the instant application and those of the applied reference, U.S. Patent Application No. 10/596,186, are coextensive. This is incorrect, as the claims of the applied reference differ in at least several respects from those of the instant application.

For example, Claim 1 of the applied reference recites two different exposure steps (whereas Claim 1 of the instant application recites only one), recites a filling step (whereas Claim 1 of the instant application does not), and recites the use of a more specific type of photoreactive composition than that recited by Claim 1 of the instant application. Such differences carry throughout the claim sets in a manner such that no claim of the instant application appears to be coextensive in scope with a claim of the applied reference (it thus being possible to infringe any claim of the instant application without necessarily infringing a claim of the applied reference). Applicants therefore respectfully submit that the double patenting rejection under Section 101 is improper and respectfully request that the rejection be withdrawn.

Concluding Remarks

Reconsideration and allowance of Applicants' claims are respectfully requested.

Respectfully submitted,

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